Seminar L-functions

Dr. Markus Schwagenscheidt and Alessandro Lägeler
ETH Zürich
Fall 2021

General informations

The seminar takes place **Tuesdays** from **12-14** in **HG F 26.5**, starting on **05.10.** until **21.12.** (12 talks).

Two students share a talk. The talks should take about 90-120 minutes. You can do a board talk or use slides (e.g. Beamer LaTex). A script in Latex is required.

Contact

Email: mschwagen@ethz.ch, alessandro.laegeler@math.ethz.ch
Website: `https://people.math.ethz.ch/~mschwagen/lfunctions`

Topics

We closely follow Don Zagier's book *Zetafunktionen und quadratische Körper* [6]. The other references can be used for further reading or to get a different viewpoint.

1. Dirichlet series ([6], §1 and §2) **E. Imamoglu and A. Fritzsche**.
2. The Riemann zeta function ([6], §3 and §4) **F. Dalessi and S. Galfetti**.
3. Dirichlet L-series ([6], §5 and §6) **S. Fawaz and D. Janett**.
4. Special values of Dirichlet series ([6], §7; also do exercises 1.,2.,3. if time permits) **E. Rossi and M. Salerno**.
5. Binary quadratic forms ([6], §8) **K. Jerkovic and R. Rueger**.
6. Class number formulas ([6], §9) **B. Simic and A. Vego**.
7. Quadratic forms and quadratic fields ([6], §10; also do exercises 1.,2.,3. if time permits) **L. Keller and A. Theorin**.
8. The zeta function of a quadratic field ([6], §11) **R. Casado and D. Schlagenhauf**.
9. Genus theory ([6], §12) **F. Kovacevic and G. Weiler**.
10. Reduction theory ([6], §13) **A. Huber and H.-M. Kim**.
11. Values of zeta functions at $s = 0$, continued fractions, and class numbers ([6], §14) **E. Mazzoni**.
12. The Birch and Swinnerton-Dyer conjecture ([3, 4]) **H. Liang and F. Naccarato**.

References

[1] T. Apostol, *Introduction to analytic number theory*

[2] H. Davenport, *Multiplicative number theory*

[3] B.A. Johnson, *An Introduction to the Birch and Swinnerton-Dyer Conjecture* `https://scholar.rose-hulman.edu/cgi/viewcontent.cgi?article=1028&context=rhumj`

[4] J. Kramer, *Die Vermutung von Birch und Swinnerton-Dyer* `http://didaktik.mathematik.hu-berlin.de/files/fermat.pdf`

[5] J.P. Serre, *A course in arithmetic*

[6] D. Zagier, *Zetafunktionen und quadratische Körper*